88-133

WATER FACT SHEET
U.S. GEOLOGICAL SURVEY, DEPARTMENT OF THE INTERIOR

U.S. GEOLOGICAL SURVEY GROUND-WATER STUDIES IN MARYLAND

GROUND-WATER ISSUES

Ground water is an abundant natural resource in Maryland. Although ground-water sources supply only 13 percent of the total water used in the State, ground-water sources serve approximately 1.3 million people (30 percent of Maryland's population). Aquifers in Maryland also provide water for industrial and agricultural uses. Of the total quantity of ground water used, 37 percent is used for public supply, 32 percent for rural domestic supply, 4 percent for livestock supply, 19 percent for industrial self-supply, and 8 percent for irrigation. Additionally, the area east of Chesapeake Bay depends almost entirely on ground water for freshwater supplies. The major issues related to ground water in Maryland are:

- Availability and use;
- Quality;
- Saltwater intrusion; and
- Contamination from hazardous-waste sites, agricultural chemicals, and stormwater infiltration.

U.S. GEOLOGICAL SURVEY PROGRAMS

The U.S. Geological Survey (USGS), established in 1879, is the principal source of scientific and technical expertise in the earth sciences within the Federal government. USGS activities include research and services in the fields of geology, hydrology, and cartography. The mission of the Water Resources Division of the USGS is to develop and disseminate information on the Nation's water resources. Activities of the USGS Water Resources Division in Maryland are conducted by scientists, technicians, and support personnel in offices in Annapolis, Cumberland, and Towson.

Hydrologic-data stations are maintained at selected locations throughout Maryland to record stream discharge and stage, reservoir and lake storage, ground-water levels, spring discharge, and quality of surface and ground water. These data are stored in the USGS National Water Data Storage and Retrieval System for use by planners and others involved in decisions that affect water resources in Maryland.

The USGS, in cooperation with the Maryland Geological Survey, maintains a network of about 500 observation wells to monitor water-level fluctuations in Maryland. Water-level measurements are used to monitor ground-water trends and provide specific data for ground-water investigations.

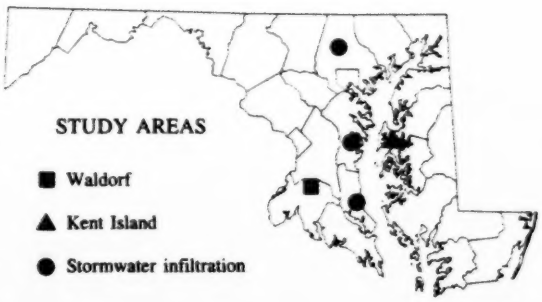
The USGS has conducted more than 100 hydrologic investigations in Maryland. During fiscal year 1988, the USGS is cooperating on a cost-sharing basis with 25 Federal, State and local agencies involving 26 hydrologic investigations in Maryland. Of these 26 investigations, 20 include studies of ground-water quantity and quality. Three examples of ground-water studies that address specific ground-water issues in Maryland are discussed in the following sections.

Availability and Use, Waldorf Area, Charles County

Urbanization of the Waldorf area of Charles County has placed increasing demands on the region's ground-water resources. From 1962 to 1980, ground-water pumpage increased from 0.15 to about 2.0 million gallons per day (Mgal/d). By 1985, pumpage increased to 2.7 Mgal/d resulting in water-level declines of 95 feet from 1962 to 1985. Planners from the Maryland Water Resources Administration have estimated water needs at 6.0 Mgal/d for the year 2000; most of this would be supplied from ground-water resources. In 1983, the USGS, in cooperation with the Maryland Geological Survey and Charles County, began evaluating the ground-water-supply potential of the Waldorf area. The purpose of the investigation was to determine whether the area's aquifers were productive enough to meet forecasts of future water needs. Available geologic and hydrologic data were compiled; new geohydrologic data were obtained from test wells, aquifer tests, and water-quality sampling. A computer model of ground-water flow was developed to estimate aquifer response under different pumping plans. County and State water managers will use the results of this study to plan future ground-water development.

Saltwater Intrusion, Kent Island

Saltwater intrusion from Chesapeake Bay has threatened ground-water supplies on Kent Island. Declining water levels and increasing chloride concentrations are related to increasing



pumpage. As development on Kent Island continues, saltwater intrusion will become an increasingly serious problem. In 1983, the USGS and the Maryland Geological Survey, in cooperation with the Maryland Water Resources Administration and Queen Annes County, began studying saltwater intrusion on Kent Island. Computer models were developed to simulate water-level response to projected pumpage and to estimate saltwater movement in response to projected pumpage alternatives. Results of the study will be used by County and State water managers to plan future ground-water development on Kent Island.

Effect of Stormwater Infiltration on Ground-water Quality

Urban stormwater runoff affects the quality of surface- and ground-water resources. Urban stormwater contributes a multitude of chemicals to streams emptying into the Chesapeake Bay. Impoundment of stormwater allows urban runoff to enter the ground-water system. The effects of such stormwater infiltration on ground-water quality, and the methods to control contaminant movement to the ground-water resource, are poorly understood. In 1985, the USGS, in cooperation with the Stormwater Management Administration of the Maryland Department of the Environment and the Maryland Geological Survey, began studying the effects of urban stormwater impoundment on ground-water quality. Three stormwater-management sites, with different geographic and hydrogeologic properties, were selected for study. At each site, changes in ground-water quality and the presence of toxic substances in the shallow materials of the impoundment bottoms are being monitored. Results of this study will be used by State and local officials to plan future management of stormwater runoff.

GROUND-WATER MANAGEMENT

The principal State agencies responsible for ground-water management in Maryland are the Department of Natural Resources and the Department of the Environment. The Department of Natural Resources, through the Water Resources Administration and the Maryland Geological Survey, is responsible for coordinating programs related to the appropriation and use of the State's water resources. The Department of the Environment is responsible for coordinating programs to protect the quality of the State's water resources. During fiscal year 1988, the following Federal, State, and local agencies have entered into interagency or cooperative agreements with the USGS to conduct ground-water investigations in Maryland:

Anne Arundel County
Charles County
Harford County
Maryland Bureau of Mines
Maryland Department of the Environment
Maryland Geological Survey
Maryland Water Resources Administration
Ocean City
Power Plant Research Program
Queen Annes County
Somerset County
Town of Indian Head
U.S. Department of the Army
U.S. Department of the Navy

SELECTED REFERENCES

Mack, F.K., Wheeler, J.C., and Curtin, S.E., 1983, Water level declines in the Magothy aquifer in southern Maryland related to increases in pumpage: Maryland Geological Survey Open File Report No. USGS 82-919, 29 p.

McGreevy, L.J., Hyatt, G.L., and Cockey, E.J., 1986, Water-resources activities of the U.S. Geological Survey Mid-Atlantic District 1984–1986: U.S. Geological Survey Open-File Report 84-490, 129 p.

Pacey, J.L., 1983, Water use forecast for Charles County, southern Maryland: Maryland Department of Natural Resources, Water Resources Administration, Water Supply Division, Water Supply Planning, Annapolis, Maryland, 136 p.

U.S. Geological Survey, 1984, National water summary 1983—Hydrologic events and issues: U.S. Geological Survey Water-Supply Paper 2250, 243 p.

_____1985, National water summary 1984—Hydrologic events, selected water-quality trends, and ground-water resources: U.S. Geological Survey Water-Supply Paper 2275, 467 p.

Information on technical reports and data related to ground water in Maryland can be obtained from:

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